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CONSTRUCTION AND RELATED INDUSTRIES

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22 OCTOBER 1986

USSR REPORT

CONSTRUCTION AND RELATED INDUSTRIES

CONTENTS

/12223

CONSTRUCTION PLANNING AND ECONOMICS

GOSSTROY STANDARD, EXPERIMENTAL DESIGN PLANS FOR 1986

Moscow BYULLETEN STROITELNOY TEKHNIKI in Russian No 3, Mar 86 pp 4-7

[Article by V. M. Spiridonov, USSR Gosstroy Glavorgproyekt chief: "On 1986 Standatd and Experimental Design Plans"]

[Text] USSR Gosstroy Resolution No 255 of 23 December 1985 approved the 1986 plans for standard and experimental design, study and generalization of domestic and foreign experience in designing and building industrial, transport, communications, water-management and agricultural projects. These are aimed at implementing the assignments stemming from the resolutions of the April (1985) CPSU Central Committee Planum, the CPSU Central Committee and USSR Council of Ministers Decree "On Further Developing Industrialization and Improving Labor Productivity in Capital Construction," the USSR Council of Ministers Decree "On Further Improving Estimate Planning and Increasing the Role of Expert Evaluation and Author Supervision in Construction," and other party and government resolutions in the area of capital construction.

In implementing the resolutions of the June 1985 CPSU Central Committee conference on accelerating scientific and technical progress, the plan topics anticipate using the latest achievements of science and technology, modern, highly efficient technological processes and advanced production experience, in construction design and practice.

The increased funds being allocated for 1986 will provide, for the first time on the necessary scale, to organize the development of standard designs on a competitive basis and will also ensure development of the necessary branch and zonal standard designs to reflect more broadly the demands of branch typification and specific local conditions.

The assignments of the "Standardization and Typification of Components, Buildings and Structures" section are aimed at further increasing construction industrialization, reducing construction-installation and planning time, lowering construction costs, saving labor, materials and energy, and also at improving the architectural-aesthetic and operating qualities of the projects being built. The subjects in this section take into account the results of scientific research completed under the assignments of the Target Comprehensive Scientific-Technical Program for Construction 0. Ts. 031 and the Work Program to Solve Scientific-Technical Problem 0.55.01, as well as the results of work on generalizing experience in designing, manufacturing and testing prototype components and items.

A complex of projects is planned which involve introducing the module-set method of constructing industrial enterprises, buildings and structures into construction through design changes. To this end, we plan to standardize the designs of subsidiary production facilities which should be built in modular units, to develop planning documentation for roof unit components of production buildings which will further develop the conveyor assembly and large-panel installation of buildings, to develop a modular-unit hydrolyzed-yeast plant design, and a number of other projects. There will be a total of 85 such projects in this area.

With a view towards further improving the space-layout and structural plans for buildings and structures of enterprises of the machinebuilding branches, the plan includes topics on developing new types of standardized buildings using lightweight metal components supplied in complete sets (LMKKP); total building area will be from 2,000 to 50,000 square meters. We will be developing the architectural-construction plans for buildings of machinebuilding enterprises which will utilize flexible manufacturing systems, as well as plans for multistory buildings with enlarged column grids. The plan is to develop recommendations on renovating enterprises of heavy machinebuilding and electrical equipment industry.

The plans anticipate completing work on intertype standardization of the space-layout and structural designs of industrial, agricultural and civil-engineering buildings and structures, with a view towards establishing parameters, dimension diagrams and products mixes of construction components for buildings for intertype application. Work will continue on improving and broadening the sphere of application of buildings made of lightweight metal components supplied in complete sets. In particular, a products list will be developed for section units of single-story production buildings for the Far East and Transbaykal, their components to be developed simultaneously. Recommendations will be worked out on improving the architectural-artistic expressiveness of LMK [lightweight metal component] buildings for large-scale use.

Work is continuing on reducing the materials- and labor-intensiveness of manufacturing and installing construction components by using effective new materials, increasing the technological efficiency, degree of factory finish and individuality of the items, and simplifying joint connectors.

In connection with the introduction of new norms for designing ordinary and reinforced concrete components (SNiP 2.03.01-84) as of 1 January 1986, there is to be a review of the blueprints for the most common components used in industrial and agricultural construction -- girders, beams, frames, and so forth, which will enable us to reduce expenditures of metal and cement.

The development of effective types of reinforced columns for single-story production buildings is to continue, including prestressed columns and columns with combination reinforcing for use in buildings up to 18 m high, including buildings erected in seismic regions, which will enable us to avoid the use of metal columns when constructing such facilities and, in so doing, to reduce metal expenditure.

We anticipate further improvement in foundation components, and foremost reinforced concrete foundations with vibration isolators for forging hammers, frame saws, and other equipment with dynamic loads, through the extensive use of automated design systems.

The work planned on standardizing engineering-structure components, and the development of standardized components for honding tanks, retaining walls, tunnels, canals and other subsurface structures in particular, will ensure a sharp decrease in the number of type-sizes of such components and a reduction in their cost and installation labor expenditures. Work will continue on consolidating installation elements and increasing their degree of factory finish.

A significant portion of the section is devoted to topics associated with improving enclosure components made of various materials. Primary attention will be focused on saving energy, materials and labor. The intention is to develop wall panels and roof slabs in economical shapes using thin-sheet steel combined with effective insulating materials. Work will continue on developing enclosure components (walls, passageways, suspended ceilings) which employ such effective materials and items as gypsum, asbestos-cement and cement-chip slabs, and so on.

With a view towards reducing installation labor expenditures, we anticipate developing consolidated wall elements up to 12 m long which are completely factory-finished, including built-in window and door units and socle panels which combine the functions of foundation beams. Work will continue on further improving the components of walls, gates, skylights and inside enclosure components made of various materials and rolled-metal shapes, including ones for use in regions with harsh climates.

In the "Industrial Enterprises, Buildings and Structures" section, the primary line of development will be planning documentation for retooling and renovating existing facilities of the leading branches of industry. The lead institutes, those with the best qualifications, will be enlisted in drawing up these plans. Considerable work is to be done on developing standard branch plans for building basic and auxiliary production facilities. The execution of standard designs at the "plan" stage is organized on a competitive basis with the use of highly efficient technologies, progressive equipment, and modern materials and components.

With a view towards raising the technical level and improving the quality of machinebuilding output, the development of planning documentation for the construction and renovation of machinebuilding facilities is being substantially expanded. Thus, we anticipate the development of a standard plan for a plant to produce 5,000 to 10,000 tons of metal-powder items [annually], standard designs for sectors tohydraolucally and mechanically recover sand from cold-hardening molds, drying units for foundries, and so forth.

Experimental designs will be developed for renovating large existing shops without stopping production, with a view towards developing and subsequently using the architectural-construction resolutions adopted to renovate industrial enterprises and microassembly shops based on new principles applying the very highest sanitation standards to productior areas and to production-process organization, as well as a number of other plans.

With a view towards accelerating implementation of the assignments outlined by the CPSU Central Committee and USSR Council of Ministers Decree "On Further Developing Industrialization and Improving Labor Productivity in Capital Construction," we anticipate developing standard and experimental designs of facilities and structures in complete-module, full factory-finished form for oil-production and gas industry projects (press pumping stations with an output of 400 - 10,000 cubic meters per day, field auxiliary units and box-units, oilfield end-stage separation compressor stations, gas-main lower-box compressor stations, gas-distribution stations, and others) whose use will significantly raise the level of industrialization and reduce construction time for oil and gas production and transport facilities.

Standard plans for buildings and structures of the production bases of oil and gas production administrations at 2,400 wells will be developed on a competitive basis, in anticipation of a high level of field construction industrialization and the introduction of advanced producer-well repair and maintenance technology, which will help increase oil production.

One of the main lines of power engineering facility planning is to ensure the development of planning documentation for nuclear power plant (AES) construction. We anticipate completing development of the plan for a unitized one-million kilowatt unit in 1936. Under the plan for studying and generalizing domestic and foreign construction and planning experience, we are planning projects which will ensure continued development of nuclear power plant, nuclear thermoelectric power plant and nuclear district heating plant project typification and unitization.

A substantial increase in work on developing standard design documentation for TES renovation and retooling is anticipated.

In connection with the reduced production of wines and liquor, the products mix of typification projects for food industry will be adjusted significantly, with a view towards using fruit, berries and grapes efficiently. Thus, for example, standard plans will be developed for an extended-storage 10,000-ton table-grape receiving and shipping center and a 500,000 decaliter grape juice production shop.

In implementing the assignments of the "Comprehensive Program for Developing Consumer Goods Production and the Services Sphere in 1986-1990," we have increased work on developing planning documentation for enterprises specialized for personal services to the public. We anticipate the development of standard plans for a plant to repair large and small household appliances, a sewn and knit garment sewing and repair factory, and radio and television repair plant, and self-service laundry receiving centers, for construction on kolkhoz and sovkhoz central farmsteads.

A standard plan for a shop to manufacture gardening shed kits will be developed, which will permit an increase in their production and improvement in their quality of manufacture.

The topics in the "Construction Industry, Building Materials Industry and Con-Struction Production" section have been selected in accordance with assignments

stemming from the CPSU Central Committee and USSR Council of Ministers decree "On Further Developing Industrialization and Improving Labor Productivity in Capital Construction" and include development of planning documentation for shops, sectors and technological lines to manufacture effective building materials, progressive components and items, which will ensure a reduction in construction labor-intensiveness, materials-intensiveness and cost.

Thus, we anticipate the development of plans for enterprises to produce reinforced concrete items (including ones for large-panel house-building), ceramic wall materials, highly effective insulating materials and items, and building materials using scrap from mining industry and ore-enrichment factories. Efficient new methods of forming reinforced concrete items will be used. Automated control will be employed for preparing concrete mixes, heat-treating molded products, and for receiving, storing and delivering cement and aggregates. Progressive new equipment will be used to manufacture ceramic wall materials, arbolite items, and so on.

The development of design documentation for mobile stock buildings and structures and enterprises to manufacture them occupies a significant place in the list of topics.

We also anticipate drawing up flow charts and work organization plans for various technological processes involved in putting up buildings and structures (including consolidated-module installation) and the development of blueprints for installation fittings, enclosure devices and hardware components for construction work itself.

The "Transport and Communications Buildings and Structures" section outlines development of standard plans for man-made railroad and highway structures using new, standardized design solutions which ensure a higher level of construction industrialization, lower component materials-intensiveness, and also improved operating qualities and durability. The components of span structures of bridges and viaducts and the supports for them, for both ordinary and northern conditions. are to be reworked in conjunction with the introduction of SNiP 2.05.03-84, "Bridges and Pipes."

Standard plans and standard design solutions for buildings and structures for rail transport will be developed to ensure increased freight turnover, higher speeds and heavier trains. We anticipate the development of standard plans and standard design solutions for STsB [signalization, centralization and block system] and communications and the trackway system which will employ new technological designs and new equipment which will provide higher railroad throughput and greater traffic safety.

For motor transport facilities, topics are outlined which take into account new forms of organizational structuring of operating and maintenance services employing the unit-subassembly method of repair based on finished spare parts. The plans can be used both for renovating existing motor transport enterprises and for building new ones.

In connection with the conversion of some motor transport to compressed natural gas, we anticipate the development of standard plans for the complete-module

and unit-container construction of motor-transport compressor stations to fill 75, 125 or 250 vehicle tanks per day. Standard design documentation will be developed on the basis of experience accumulated in planning, building and operating such stations in various regions of the country.

Standard plans will also be developed for service stations for cars belonging to citizens. These will be comprised of 10 or 20 bays made of lightweight components supplied in complete sets for construction in seismic regions of the country.

For buildings and structures of civil aviation airports, the plan anticipates the development of new and reworking of obsolete standard plans for passenger service buildings, cargo storage areas, emergency-rescue stations, and so on. We will continue developing the series of standard plans for air traffic control, landing and navigation devices to automate and provide telemetry for technological processes which will ensure a high degree of air traffic safety and high level of air traffic control effectiveness.

The topics for standard planning in the field of communications are directed towards resolving the tasks of accelerating the rates of development of television broadcasting and telephone installation in the 12th and 13th five-year plans. The technological portion of long-distance telephone communications plans is to incorporate new digital transmission systems equipment. We plan to develop standard radio and television transmitting stations, including multiplexing ones. A standard plan will be developed for retooling existing ATX [automatic telephone exchanges] to handle 20,000 numbers; these will utilize the latest electronic equipment.

The "Agricultural and Water Management Production Buildings and Structures" section was drawn up to reflect the assignments of the program to solve scientific-technical problem 0.55.14, "Develop and introduce effective types of agricultural buildings, structures and enterprises with a high level of construction industrialization" and the basic directions of agricultural development as defined by the USSR Food Program. We anticipate reworking a number of standard plans on the basis of experience accumulated in their construction and operation and recent scientific and technical achievements. The development of economic zonal standard plans is to be expanded to reflect the natural-climate zones of various zones of the country for all branches of agricultural production.

Standard plans are to be developed on a competitive basis for complexes to raise and fatten 2,500 and 5,000 head of cattle a year, for 2,000- and 4,000-ton silos for powdered fertilizers and reclamation chemicals and employing new pneumatic technological equipment, and storage units for potatoes, vegetables and fruit; these latter are to be in various sizes and will include lightweight metal components and use highly effective methods of storage which ensure better preservation of potatoes, vegetables and fruit.

A number of standard designs are to be developed for maintenance centers for large tractors; repair shops for harvester, tractor and truck-drawn attachment parts and organic fertilizer application vehicle parts; these are to use progressive construction components, advanced technology and highly productive technological equipment.

We plan the development of standard plans for reclamation system hydraulic engineering structures which will ensure significant savings in water use and improved labor productivity in the production of agricultural output and which will take into account the various features of water distribution and irrigation equipment.

The topics in the "Storage Buildings and Structures" section include development of interbranch facilities for storing manufactured goods, food and other agricultural produce, various refrigerators, tanks for oil and petroleum products, chemicals, water, and so on. The storage facilities plans will be developed to reflect scientific achievements and advanced storage technology and new means of mechanizing and automating technological and labor processes which will ensure waste-free storage, transport and processing of stored materials and produce.

Standard plans are to be developed for various sizes of metal reservoirs for storing chemicals on-site in various branches of industry, as are experimental plans for 150, 300, 700 and 2,000 cubic meter reservoirs designed for storing and mixing ore concentrate pulp, regulating its density and preparing it for hydrotransport.

The topics in the "Sanitary Engineering Systems and Structures" section anticipate continued improvement in these systems and structures, intensification of their operation, the thrifty use of materials and fuel-energy resources, as well as environmental protection. The latest scientific and technical achievements will be the basis of this planning work.

We are planning to develop designs for heat-exchanger types of precipitation conditioning units, devices for thorough wastewater pretreatment for subsequent use in industrial water supply systems and devices for treating surface runoff from industrial enterprise sites; we anticipate development of highly efficient wastewater treatment plants employing 18- and 24-meter aeroaccelerators, sedimentation ponds, oxygen-dispersion oxytanks, multistage oil traps, circulating water supply pumping plants interconnected with cooling towers on the roof.

The plan outlines topics dealing with implementing USSR Gosstroy collegium resolutions on modular construction of boilers and the use of recovered energy resources. In particular, we plan to develop working documentation for the industrial setting of boilers and boiler rooms of modular design, experimental designs for prefabricated reinforced concrete smokestacks up to 100 meters tall and boilers made with large construction-technological modules with maximum factory finish in buildings made with precast reinforced concrete and lightweight metal components.

The new standard plans anticipated by the 1986 plan will be developed on the basis of the latest achievements of scientific-technical progress, with consideration of advanced foreign and domestic construction and planning experience, and in accordance with the requirements of the technological planning norms, a review of which was completed in 1985.

Updating the stock of current standard plans for industrial and agricultural construction will permit substantial improvement in the qualitative indicators

characterizing standard planning documentation. Thus a selective analysis of technical-economic indicators by group of standard plans for the construction of projects with identical functional designations shows that the improvement in them per calculation unit will be a 2-4 percent reduction in estimated cost, up to a nine-percent reduction in materials expenditures, and a 5-8 percent reduction in the labor-intensiveness of construction-installation work.

The economic effectiveness of using standard designs when planning capital construction projects will exceed roughly 200 million rubles in 1986.

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CONSTRUCTION PLANNING AND ECONOMICS

ACHIEVING STRUCTURAL, BALANCED DEVELOPMENT AT CONSTRUCTION COMPLEXES

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 10, Oct 85 pp 57-59

[Article by V. Shelomentseva]

[Abstract] A resolution of the CPSU Central Committee and USSR Council of Ministers "on improving planning, organization and control of capital construction" places particular attention on the need for balanced development of production facilities in construction and installation organizations. Cooperation among different departments in an attempt to achieve this balance has created a number of problems. Examples include mismatches of capacity and need for manufacture of reinforced concrete structural elements, requiring that heavy reinforced concrete be transported across the Soviet Union. Other problems include too-frequent changes in designs included in plans, changes which seem to be economically justified locally, but which require distant facilities to manufacture nonstandard parts and assemblies. The problem of balance involves correlating industry branch and territorial interests in dealing with the shortage of construction materials, parts and structures.

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POOR QUALITY, RISING COSTS TACKLED BY BALAKOVO EXPERIMENT

Moscow EKONOMIKA STROITELSTVA in Russian No 5, May 86 pp 27-29

[Article by V.A. Valdyaev, CPSU Volsk Gorkom first secretary, Saratov Oblast: "How To Enable People to Improve the Quality of Housing Construction"]

[Text] The new edition of the party program adopted at the 27th CPSU Congress indicates that the party attaches particular importance to the following task: finding a quick solution to the housing problem that will enable essentially every Soviet family to have separate housing, either in an apartment or individual house, by the year 2000. Issues which received special attention included raising the quality of housing construction, enhancing the comfort level, designing better housing layout, and installing more adequate fixtures.

In examining the current state of affairs in housing construction, we should point out that quality and level of comfort are not at the level the people need. The reason for this is not the low quality of buildings, although this is a problem at times, but the increased cost that improving apartment quality and comfort level entails. This cost includes actual housing construction and usage costs, as well as the cost of producing construction materials, articles, and equipment.

A large increase in capital investment can solve this problem, although solving it in this way will slow down the amount of new housing being finished, thus making it even more difficult to deal with the original problem and provide every family with its own apartment.

As construction and usage costs grow for housing, quality and consumer serviceability must both improve correspondingly. Thus, any assessment of the most effective way to invest capital in building must take social as well as economic factors into consideration. Currently, planning agencies and design and construction organizations tend to put emphasis primarily on economic factors when studying a housing construction project. Because the cost of materials and other factors involved in the cost of housing grow over time, these organizations use finishing materials and fixtures that are cheap, generally unsatisfactory, and do not get a unit of housing ready for its new occupants. This means that every third occupant planning to go "one on one" with his new apartment has to refurbish it at least to some extent in order to have it match his current and future needs and aesthetic taste.

Refurbishing apartments normally means changing plumbing, gas, and electrical fixtures, adapting the apartment to the new fixtures, repapering or repainting, laying tile in the kitchen or bathroom and shower, putting new linoleum or parquetry on floors, upholstering doors, changing door locks and handles, etc. Almost every second new occupant has to change the built-in shelves, installing ones made of better quality materials than the original fiberboard ones.

In other words, the work done by the original builders is useless. To a great extent, these problems occur in areas where construction is a cooperative project paid for by kolkhozes.

Refurbishing these apartments uses up a huge amount of additional human, material, and transportation resources, since twice as much of them is needed for every square meter of living space constructed.

If more than two million apartments are built every year, and if 100 rubles (a very modest estimate) worth of useless work is done in each of them, the effort needed to correct the situation costs about 70 million rubles. Data show that in 1983 it cost 9,800 rubles (Footnote 1) ("USSR Economy in 1983," Moscow. Statistika, 1984, p 422) to build an apartment. Another 72,000 apartments could be built using this money, and the materials wasted on refurbishing saved.

In some cities, new occupants get their apartments refurbished by such firms as "Zarya" that have been organized by Soviet of People's Deputies ispolkom repair and construction agencies, who will do some repairs, installations, and finishing work, charging only for the cost of the materials. The finishing materials are obtained from market sources and from such specialty stores as "House of Wallpaper," "Plumbing Equipment," "Lighting," and others.

However, studies have shown that most new occupants "secure" these materials in various ways from enterprises, construction organizations, and from private individuals, all of which leads to abuses and violations of the law. New occupants are doing all this not because the quality of the construction and finishing work in their apartments is bad, but because it has been done without consulting them and, consequently, without consideration of their tastes or present and future plans.

In order to gain the maximum social benefit from improving quality and the comfort level of housing, we need to forecast changes in patterns of work and daily life and develop organizations capable of performing extensive sociological, sanitary engineering, psychological, and ergonomic studies of living conditions. Civil housing construction research institutes, academic institutes, medical research institutes, VUZ departments, and other organizations are all working on this issue. Nonetheless, there is no close cooperation between them, and, in any case, they can hardly be expected to consider the individual needs of every single person in the standard design projects they work on.

In order to eliminte the problems noted above and use capital investment more effectively, the USSR Gosstroy ratified an 11 May 1983 instruction entitled "A System for Improving Fixture Installation and Finishing Work on Apartments for Private Individuals Using Their Funds in Cities of the Union Republics." The instruction, which had been approved by the USSR Gosplan, the USSR Ministry of Finance, the USSR Stroybank, and the All-Union Central Soviet of Labor Unions, yielded nothing in the way of practical improvements.

For the last two years, the Balakovo city Soviet of People's Deputies, where the author of this article worked for many years, has been experimenting with a system of building in which housing is constructed to the order of those who will be living there. The new technique consists essentially of the following.

Housing is allocated according to a person's priority three to four months before construction of a planned building actually begins. The future occupants receive timely notification telling them what the address of the building is, what apartment number they have been given, and when they can turn in their order for the finishing of the apartment. To aid in this, there is a standard design building with eight model rooms in which a specialist shows what materials, fixtures, trim, or built-in furniture are available from the construction organization or takes orders for other choices through the USSR Gossnab, although it cannot guarantee delivery within three to four months.

The following are among the finishing materials, fixtures, and bathroom and lavatory furnishings approved by the USSR Gossnab: built-in furniture, linoleum, parquetry, tiles, tubs, radiators and convectors, washers, wash basins, toilets, chandeliers, lamps, locks, ironware, door handles, whitewash, paint, enamel, wallpaper, cornices, heater screens, plasticware, veneer doors, etc.

After agreeing with the contractor on how the apartment will look and be furnished, the occupant must make up the difference between the original cost estimate and the one with his additions. Once the contract is completed, the contractor is bound to deliver the apartment to the client in accordance with the agreement. He also has to provide a quality assurance statement.

In essence, this means that once construction begins, the new occupant knows perfectly what his apartment will look like and how it will be furnished. He may pay for the extras either at that time or in installments. Both methods of payment are explained in the 28 May 1969 CPSU central committee and USSR Council of Ministers Resolution No 392 "Measures to Improve the Quality of Civil Housing."

Experience has shown that the cost of improving the finishing and furnishings in an apartment shift from zero for the standard apartment (there are almost none of these) to 1,800 rubles for one with the greatest comfort level offered by the contractor.

In order to conduct the experiment, the ispolkom of the city Soviet of People's Deputies and the general contractor, the USSR Ministry of Energy

and Electric Power Administration, took the following preparatory steps.

Plans were developed to establish an integrated construction material and equipment supply system. The plans for the system, which was known as the "House of the New Occupant," were approved by the USSR Gossnab Volga AREa Administration for Material and Equipment Supply, by party and soviet organizations, and by the Saratov CPSU Obkom.

A general construction plan has been worked out for the city by the State Civil Construction Agency Central Research and Planning Institute for City Planning.

A common purchaser of construction, the gorispolkom UKS [Capital Construction Administration], has been organized. And a common contractor, the Saratov State Electric Power Administration, performs construction of housing and public facilities.

The housing construction amalgamation has been modernized and is now capable of producing advanced types of structural elements and constructing state-of-the-art housing. Another organization which has been modernized is the Housing Construction Agency, which has been provided with shops to manufacture non-standard fixtures and built-in shelves, produce finishing materials, process local construction materials, etc.

A special account has been opened to accept payment for additional finishing and furnishing of apartments. And enterprises' labor union organizations have coordinated the deadlines for turning in housing waiting lists to the gorispolkom.

Analysis of the findings from this equipment has shown that using the experimental technique discussed in this article not only makes construction more cost-effective and improves the quality of housing, but solves many other social problems as well. Dwellers become more interested in maintaining their buildings and enterprise-manufacturers producing finishing materials and fixtures become more fully aware of the level of quality needed to satisfy customers. New occupants become more scrupulous in checking the quality of construction and builders develop a greater sense of responsibility for the quality of their work.

All the buildings erected over the last two years using the "special order" technique and occupant-provided money have received a mark of "outstanding." Party and soviet organizations have not received a single complaint about poor quality, something that cannot be said about apartments planned and put up in the traditional way.

The gorispolkom inspection commission almost never checks the quality of finishing work done under the auspices of the experiment, since the client accepts the apartment directly from the construction team and performs the inspection. The commission's role is simply to check to make sure construction is completed, telephone lines are put in, and sewage disposal and water are provided.

In the wake of the experiment, it has become clear that it is time to restructure and reorganize buyer services and to give the contractor certain functions now performed by many buyers (for example, supplying fixtures).

Every administrative center must begin coordinated study of and find solutions to those housing construction problems that are peculiar to various organizations within various departments, or which are simply not being dealt with.

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BRIEFS

NEW TECHNIQUES LOWER COSTS--Kostroma--Specialists at the Kostromaselkhozproekt [Kostroma Agricultural Planning] Institute have developed a new method of inexpensive one-piece house building using arbolite. Construction on the first home of this kind was finished late last year in Makarevsky rayon. Because of the simplicity with which buildings can be erected and the use of inexpensive materials, the construction costs have dropped by 15 percent and 12 percent less labor is required. Other developments made by the institute have been used to lower construction costs. For example, using shallow foundations on a bed of sand in place of continuous footing yields savings of 4.5 tons of cement, nine man-days, and 570 rubles per hundred linear meters. [Article by B. Drogalin: "Lowering the Cost"] [Text] [Moscow STROITELNAYA GAZETA 2 Apr 86 p 3]

PREFAB KARELIAN HOUSES--Petrozavodsk--Rural Ukrainians and Belorussians have received the first in the new series of three-room pre-fab houses from the forests of Karelia. The new houses feature a convenient room and utility area lay-out and attractive exterior. The Petrozavodsk Soviet Constitution House Building Amalgamation has also taken the needs of people who will have to do on-site assembly of their pre-fab cottages into consideration. A small brigade of workers can assemble such a building in a matter of days. In this year alone, the workers in this northern area will produce more than 6,000 of the homes in the new series for rural areas. And by the end of the five-year plan, this figure will double. [TASS article] [Text] [Moscow STROITELNAYA GAZETA 7 May 86 p 3]

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PLANNED DEVELOPMENT OF KAZAKH CONSTRUCTION MATERIALS INDUSTRY

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 1, Jan 86 pp 7-9

[Article by O. Beysenov, Kazakh SSR Minister of Construction Materials Industry: "The Building-Materials Industry Should Be Developed Ahead of Time"; the capitalized passages were published in boldface]

[Text] The draft of the "Main Directions for the Economic and Social Development of the USSR During 1986-1990 and During the Period up to the Year 2000" is being discussed within Minpromstroymaterialov [Ministry of Construction Materials Industry] enterprise collectives in an atmosphere of high labor enthusiasm. Clea-ly, the document's chapter that speaks about capital construction's basic task--the further buildup of the country's productive potential on a new technical base, taking into account the systematic development and reequipping of all branches of the national economy--is the center of attention of blue-collar workers, engineers, technicians and white-collar workers.

The building-materials industry is the fundamental materials base for construction. The prerequisites, not simply for realizing current plans but for realizing them on a new technical basis through the output of modern materials and structure, are being created in this industry. Therefore, ensuring the continuous and outstripping development of the building-materials industry is that industry's main goal.

During the 11th Five-Year Plan (assuming 1985 plan fulfillment) output volume of the republic's Minpromstroymaterialov-system enterprises rose 1.2-fold, including increases of 501,000 tons of cement, 52.4 million standard-equivalent asbestos-cement tiles and 246.2 km of asbestos-cement pipe, the output of soft roofing doubled, and the output of prefabricated reinforced concrete rose by 70,000 cubic meters and of quarried materials by 1.7 million cubic meters. The increased proportion of efficient materials was reflected beneficially in growth of labor productivity in construction and a rise in the architectural expressiveness of the housing and the facilities for nonindustrial, cultural and consumer-services purposes being erected in Kazakhstan. The production of linoleum was mastered. The output of products for facing that are made from natural stone and for earthenware plumbing rose 3-fold. Enterprises began to provide almost 1.5-fold more white and colored portland cements, and the output of ceramic tile for interior decorating increased 25 percent. Ceramic facing tiles and flooring tiles have begun to be

produced in greater quantities, more than half of the flooring tiles being produced on a large scale with seriographic coating. The share of special types of cements--fast-hardening, sulfate-resistant, plugging, and road cements--in overall cement production has increased. The technology for producing sulfate-resistant slag portland cement based on granulated slag from phosphorus production was mastered at the Chimkent Cement Plant, allowing the shortage which had existed to be remedied.

The output of structure for new-series large-panel apartment houses started at the Kustanay and Semipalatinsk Prefabricated Reinforced-Concrete Combines. The production volume of enclosure structure made of lightweight and cellular concretes rose. They are being used at the Temirtau and Pavlodar DSK's [Housing Construction Combines] to produce items for two-unit 126-series apartment houses for the countryside.

At the same time, there are important deficiencies in the industry's work.

First of all, the industry has remained greatly in arrears to the builders. It had a shortfall of more than 2 million tons of cement delivered. The production of wall materials fell 200 million standard-equivalent bricks below the level reached in 1980. Because of irregular operation alone, Minpromstroymaterialov cement plants and wall-materials enterprises did not meet the assigned goals for increasing labor productivity and profit.

The situation that was created was greatly aggravated by the fact that for a long time an engineering policy oriented to extensive-type factors in developing industry reigned and proper attention was not paid to problems of rebuilding and reequipping existing enterprises and to raising, on that basis, the quality of the output being produced. Thus, during the 10th and 11th Five-Year Plans, 455 million rubles of capital were invested in developing the industry and 227 million rubles' worth of construction and installing work was done. But only 86 million rubles of these funds, or 19 percent, were directed toward reequipping and rebuilding.

Undoubtedly, new capacity for producing some scarce building materials had to be built up. Especially in the case of the newest technologies. And such capacity was put into operation. This included facilities for producing cement by the dry method--2.36 million tons of capacity at the PO Karagandatsement [Karaganda Cement Production Association] and the Karaganda and Burunday Ceramic Wall Materials Plants, based upon Bulgarian equipment, at the Ural Silicate Wall Materials Plant, based upon Polish Equipment, and at the Kzyl-Orda plant, based upon domestic equipment, other facilities with a total capacity of 420 million standard-equivalent bricks, and capacity for the production of 125 million square meters of soft roofing, 500,000 units of earthenware for plumbing and 100,000 tons of acid-resistant items.

Capacity for producing 1 million square meters of linoleum, 740 km of standard-equivalent asbestos-cement pipe, 25 million standard-equivalent roofing shingles, 96,500 square meters of natural-stone facing slabs, 64 million standard-equivalent bricks, and other items was introduced through reequipping and rebuilding. Unfortunately, reequipping and rebuilding still

have not become the guiding trend in the industry. As a result, the fixed capital of many enterprises today is worn and obsolete.

Heavy physical labor predominates in some subbranches, especially in brick production, where the share thereof is 45 percent. It is clear that work performed on worn and obsolete equipment adversely affects productivity and personnel retention.

The updating of equipment and the mastery of new manufacturing processes are being accomplished mainly at newly built enterprises. Unfortunately, major deficiencies also exist here. This can be illustrated by the example of the Novokaraganda Cement Plant, at which a progressive technology for obtaining cement by the dry method, based upon domestic equipment, has been undergoing mastery since 1975. It turned out that the new technology was created by selecting techniques and equipment that were unique and far from having been approved. Unfortunately, the industry's scientific-research and design organizations that developed this technology and the machinebuilders who manufactured the new equipment are today not taking responsibility for their blunders and, for this reason, show no interest in accelerating assimilation of the plant's capacity. These miscalculations place a heavy burden on the enterprise's shoulders.

This is why we accept with special satisfaction the principle described in the draft of the Main Directions about intensifying the responsibility of scientific organizations for the level of research and development and for the most complete use of them.

Of course the cement industry must do further systematic work to reequip existing plants that make cement by the wet method, gradually converting them to the dry or the "composite" method of production. We have sent the appropriate recommendations to USSR Minstroymaterialov.

We are also encountering today no few difficulties in reequipping and rebuilding existing brick plants. The process is slowed by the fact that there are no good manufacturing developments for these enterprises, and production of the newest domestic equipment has not been arranged. The mechanized complexes of equipment that have been created for producing clay brick are not effective. Thus the SMK-172 and SMK-182 equipment complexes and other modifications have poor technical and economic indicators. While the new SMK-245 complex, with a capacity of 60 million standard-equivalent bricks per year, which, according to the intentions of its creaters, is designed for operating with any raw material, still has not been tested under operating conditions. The developers and machinebuilders must speed up the creation of new technology and equipment for brick plants.

The receipt of imported equipment facilitates, of course, the machinebuilders' job, but, as experience indicates, various components of equipment delivered from abroad require refinement. Thus, because of constructional deficiencies, the Bulgarian presses at the Burunday and Karaganda Brick Plants were replaced by domestic equipment--SMK-217's. Equipment for preparing the charge and for processing it does not yield the designed capacity--60 million standard-equivalent bricks. Great difficulties arise in spare-parts supply.

In considering that the intensification of production should be developed during the forthcoming five-year period primarily on the basis of reequipping and rebuilding existing capacity, the republic's Minpromstroymaterialov has worked out and presented to USSR Minpromstroymaterialov industrial administrations drafts of plans for reequipping aand rebuilding a number of enterprises during 1986-1990. Before compiling these documents, we enlisted branch institutes for a detailed study of the composition of each subbranch, the discovery of bottlenecks, and the establishment of a realistic technical level for existing plants.

The cement industry is to reequip the enterprises in accordance with the contemplated program. Its main goal is to increase the operating reliability of the basic manufacturing equipment. It is proposed that funds and material resources be directed primarily to the elimination of design and constructional deficiencies in facilities that make cement by the dry method within the Karagandatsement Production Association. At the Chimkent plant, facilities for reserve fuel must be erected and the quarrying activity must be rebuilt. At the Semipalatinsk plant, the off-site water supply must be rebuilt. At Sas-Tyubinsk, conversion of manufacturing line No 1 to a new technology must be completed. This year the Minpromstroymaterialov consultants' commission should define the next steps for developing this plant.

The draft of the plan for reequipping and rebuilding the ministry's wall, heat-insulation and porous-materials enterprises during 1986-1990 was reviewed by the Administration of the Wall and Heat-Insulating Materials Industry of the country's Minstroymaterialov, and it was approved in May 1985. In accordance with the plan, it is planned to carry out major work at existing enterprises in terms of modernizing the manufacturing lines by replacing obsolescent and worn equipment and by mechanizing and automating manufacturing processes, especially those where heavy manual labor predominates. In particular, annular kilns will be rebuilt, with the installation of removable roofs. At some brick plants, it is planned to replace presses with more modern ones that will allow conversion to the output of hollow silicate brick.

For producing autoclaved wall materials, the creation of completely automated lines by rebuilding departments that make small wall modules out of cellular concrete has been adopted as policy.

Implementation of the measures contemplated for rebuilding this subbranch of the industry will enable capacity for producing wall materials to be increased by 628 million standard-equivalent bricks, 410 workers engaged in heavy physical labor to be released and labor productivity to be increased by 3.1 percent.

The republic is also calling for the introduction into operation of a number of enterprises whose products undoubtedly will raise the technical level of construction. The share of efficient materials, such as gypsum-board slabs, extruded asbestos-cement panels, plumbing products, linoleum, new types of products made of mineral wool, and heat-resistant concretes will be increased.

The structure of the wall materials field also will be changed, through the construction and introduction into operation of enterprises that are built

out of cellular concretes and are equipped with highly mechanized and automated and mechanized lines. Expansion of the output of plumbing products and the mastery of highly artistic ceramic tiles are planned. Molded and high-strength gypsum will be produced.

The expansion of existing enterprises for quarrying and processing natural-stone facing materials has already started, in connection with construction of the subway in Alma-Ata.

During the new five-year plan we are to improve radically the work of Alma-Ata's NIIstromproyekt [Scientific-Research Institutes for the Design of Building-Materials Industry Enterprises]. A number of brick and crushed-rock plants have been built and put into operation under this institute's designs. However, because of major design errors, it has not been possible to assimilate their capacity. At the same time, the developers have not borne any kind of responsibility for this. Therefore, WE CONSIDER IT DESIRABLE TO TRANSFER ALMA-ATA'S NIISTROMPROYEKT TO THE JURISDICTION OF KAZAKH SSR MINSTROYMATERIALOV AND TO ORGANIZE A SCIENCE-AND-PRODUCTION ASSOCIATION ON THE BASIS OF IT. This will raise the interest of the institute's collective in the final results of its work.

The industry's labor collectives and staffs face big and important problems. Primarily it is necessary to insure the achievement of higher operating effectiveness of existing production facilities and observance of the strictest savings program concerning the use of all types of resources, and to achieve a strengthening of plan and work discipline and a rise in the responsibility of personnel for the job assigned them. Building-materials industry workers have been steered toward solution of the primary mission--to meet capital construction's growing requirements for high-quality building materials and constructional structure and, to this end, paramount attention must be paid to questions of the modern development and reequipping of enterprises.

Based upon this, we propose an additional heading, "Capital Construction," with the following formulation: "ENTERPRISES THAT PRODUCE THE NEW, EFFICIENT BUILDING MATERIALS SHOULD BE BUILT AND REEQUIPPED AHEAD OF TIME. INCREASE THE RESPONSIBILITY OF CONSTRUCTION PARTICIPANTS FOR THE COMPLETE ASSIMILATION OF CAPITAL INVESTMENT AND TIMELY INTRODUCTION THEREOF INTO OPERATION."

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GREATER PRODUCTION OF EXPANSIVE CEMENT NEEDED

Moscow EKONOMICHESKAYA GAZETA in Russian No 18, Apr 86 p 5

[Article by V. Mikhaylov, RSFSR Distinguished Scientific and Technical Worker, Professor, and Doctor of Engineering Sciences, and T. Kuznetsova, Professor and Doctor of Engineering Sciences (Moscow): "An Indifferent Attitude Toward an Economical Material"]

[Text] Expansive cement (NTs) has a special role among special types of cement. Being a Soviet invention, it is a fundamentally new type of binding agent whose technical parameters are drastically improved over the portland cements widely used at present.

Let us name just the main qualities of items made of expansive cements, which make them exceptionally economical. First, they have high bending strength. which increases 1.4-fold in a year and a half. Second, they are highly durable. Concrete prepared with the use of NTs endures one and a half thousand cycles of freezing and thawing. This means that structures can last more than a hundred years. Third, they have reliable impermeability to water (at a pressure of more than 16 atmospheres), allowing pressure-type pipelines to be laid without steel jacketing, which is in short supply, storage tanks and reservoirs to be built, and roof coatings and liners for subway tunnels, mine shafts and various other underground structures to be made without using roll-type waterproofing.

The use of NTs for subway-tunnel liners in water-saturated soils saves 5,300 tons of metal and 650,000 rubles for each kilometer of tunnel. From 1,500 to 3,000 rubles are saved for each 1,000 square meters when making water-insulating shields out of NTs, instead of clayey insulation, for underground structures.

The use of NTs in structure used in making grandstands for stadia, skating rinks and swimming pools for Olympiad-80 imparted to these structures reliable strength and durability and full impermeability to water and allowed a saving of more than 12 million rubles.

Other qualities of the new material also are important. Hard rocks are destroyed by means of special compositions of expansive cement. The possibility of mining valuable stone (granite, marble, onyx and so on) in quarries

is opened up, this being done without cracking or damaging the blocks. If necessary, large members of structures can be cut apart anyplace--at an enterprise or in a city--without an explosion or the adoption of special safety measures.

The collective of the inventors of this unique material was awarded the USSR Council of Ministers Prize back in 1980 for organizing its industrial output and for introducing it into construction practice.

The production of expanding cements in large amounts and of guaranteed quality is supported by the country's practically unlimited reserves of alunite ores and the existence of vast amounts of slag (granulated blast-furnace and aluminiferous slags), wastes from alumina production, the ashes of GRES's, and so on.

But strange as it may seem, NTs output still has not reached even 100,000 tons. This can be explained only by the passivity of USSR Minstroymaterialov [Ministry of Construction Materials Industry]. It seems to us that such a state of affairs in no way meets the demands for accelerating scientific and technical progress.

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CONCRETE WORK DURING WINTER AT BALAKOVSKAYA AES

Moscow ENERGETICHESKOYE STROITELSTVO in Russian No 2, Feb 86 pp 49-52

[Article by Candidate of Technical Sciences V.S. BELENKIY and Engineers Yu. K. KOVRIGIN and A.I. SAVKIN]

[Abstract] Construction of the main building of one power unit at a nuclear power plant utilizing a VVER-1000 reactor requires placement of 110,000 cubic meters of concrete and reinforced concrete, mostly monolithic. At the Balakovskaya Power Plant, significant quantities of concrete must be poured during the winter, since the winter season lasts five months in this area. Analysis of the massiveness of the major structures in the main building of the first power unit has indicated that there are three types of structures, differing in the surface modulus. Studies have been undertaken to determine the desirability of using uncovered methods of placing monolithic concrete in the structure at air temperatures down to -25°C. Usage of insulation is found to be sufficient to prevent freezing of the structures. Nonutilization of separating grids will also increase the monolithicity of the concreted structures, increasing the contact between neighboring concreted blocks. The system of continuous pouring without the use of seams for the foundations of turbine units with separating screens at 40 to 50 cubic meters per hour is found to have no advantages over concreting in separate blocks. The uncovered method of placement of concrete in massive structures can be significantly simplified by not preliminarily heating the base to a depth of 300 mm as is commonly done. The experts suggest placement on the frozen base of a contact layer of concrete 50 cm thick at a temperature of 15°C containing sodium nitrite as an antifreeze additive. The addition of $NaNO_2$ prevents freezing of the contact layer during the first day after it is placed until exothermic heating begins. Sodium nitrite is the only antifreeze which can presently be used for this purpose.

Figures 4, reference 3: Russian.

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